Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/708
YUGOSLAVIA
February 1964
Submitted in:
ENGLISH and FRENCH

Confidential until official release during Conference

Abstract

LEAKAGE SPECTRUM OF THERMAL NEUTRONS

R. Kladnik
Nuclear Institute "Jožef Stefan", Ljubljana, Yugoslavia

A short review of the variational-iterational method of solving the integral transport equation for thermal neutrons in a semi-infinite source-free absorbing medium is given. This method is used to obtain explicit expressions for the linear extrapolation distance and leakage flux of thermal neutrons in terms of the corresponding infinite medium solution.

For illustration, a classical monatomic gaseous moderator has been chosen for which the infinite medium solution has already been obtained semi-analytically. The absorption cross-section is supposed to follow the 1/v law. The numerical part of the problem has been solved on the IBM 704 digital computer.

Numerical results for the linear extrapolation distance for different atomic mass numbers with several degrees of the absorption probabilities of the medium are presented. Also, the effective temperature of leaking neutrons is discussed as a function of the atomic mass, the absorption of the medium, and for different directions of neutron leakage.

Theoretical results are discussed in comparison with the experimental values.